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AUTHOR Christie, Alice
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ABSTRACT

The electronic information age is here, and adults as well as children are using new ways to gather and generate information. Electronics users are writing in hypertext; exploring cyberspace; living in virtual communities; scooping interactively with CD-ROMs and laserdiscs; using File Transfer Protocols to upload and download information from around the world; communicating asynchronously using e-mail; and surfing the Internet. This paper describes elementary school children using technology to explore cyberspace and to communicate with others via e-mail, with enhanced literacy as an important outgrowth. This naturalistic study of elementary school children using computers and telecommunications highlights: (1) the journeys of several third graders from nonreaders to researchers, and (2) the electronic interactions of two fourth graders. Observations, interviews, and review of documents provided insights into how technology and the Internet can become highways to enhanced literacy. (Author/AEF)

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ED 419 495

Paper Session

Using Technology to Enhance Literacy in Elementary School Children

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Alice Christie
Arizona State University West
PO Box 371000 MC 3151
Phoenix, AZ 85069
602.543.6338
alice.christie@asu.edu

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Abstract

This naturalistic study of elementary school children using computers and telecommunications highlights (a) the journeys of several third graders from nonreaders to researchers and (b) the electronic interactions of two fourth graders. Observations, interviews, and review of documents helped the researcher gain insights into how technology and the Internet can become highways to enhanced literacy.

I had a good time yesterday.
I enjoy learning about computers.
I like sending email.
I don't have a computer at home. I wish I did.
Katey, Age 10, September 27, 1994

The electronic information age is here, and adults as well as children are using an incredible number of new ways to gather and generate information. Even the metaphors used to describe the use of this new technology give evidence to the wide range of possibilities. Electronics users are writing in hypertext; exploring cyberspace; living in virtual communities; scooping interactively with CD-ROMs (Compact Disc Read Only Memory) and laserdiscs; using FTPs (File Transfer Protocols) to upload and download information from around the world; communicating asynchronously using e-mail with colleagues, friends, like-minded strangers, even the President of the United States; and cruising or surfing the Internet, commonly referred to as the information superhighway. This paper is the story of elementary school children using technology to explore cyberspace and to communicate with others via e-mail. Although not the primary goal, enhanced literacy is an important outgrowth.

Theoretical Stance

*I love your class.**
I haft to write to some one else. BY
Amie, Age 9, June 10, 1994

IR018966

Dear Marcia (mom ,)
what are we having for super?
Dady seid he miht tack me to the law librarey
after computer clas,
I love you From Charles

Charles, Age 7, November 14, 1994

* Throughout this study, I quote children extensively. In these quotes I use their spellings, not conventional spellings, so that the reader can get a better sense of the voices of the children.

This study tells a story, and every story has a storyteller. I am the storyteller and this story reflects my beliefs, biases, and world view. Meredith Cherland (1994) eloquently frames her book *Private Practices* in this way, and I use her words as a frame for my story as well:

> *I am the person who has chosen the events that comprise the story.*
> *I have arranged them and shadowed them with my meanings ...*
> *In this way, I have done what every researcher and storyteller does.*

This is not an objective story; no story is. For that reason, I explicate my beliefs and theoretical stance below.

> *I have seen people and events in the light of my own belief systems, experiences, and discourses, and I have told what I hope is a compelling and authentic story that is consistent with what I believe about the world. (p. 2)*

Theoretically, I view both literacy and the computer as social and cultural constructions. Both of these constructs are assumed to be constructed within a culture and are defined in numerous ways by different cultures and individuals within any given culture. I assume, as does Gilligan (1982), that the way people talk and write about their lives is significant, that the language they use and the connections they make reveal the world as they see it. Therefore, I used interpretive methods in an open-ended environment so that I might better study and understand the interface between literacy and technology.

Meaning is endowed by individuals within a particular context—in this case, the classroom culture of a Telecommunications Workshop offered by the researcher to elementary school students. The meanings the children attached to the construct of "computer" were as individualized as the children themselves:

> *A computer is a machine with a screen. You can see great pictures on it.*
>
> *Rob, Age 9*
>
> *A computer is a machine you can write letters to your friends on.*
>
> *Mandy, Age 11*

A computer lets you get around to place you want to go.
Liza, Age 9

A computer is to help people look up things.
Tom, Age 10

A computer is for playing games, doing research.
Andy, Age 9

Review of Relevant Research

As a feminist researcher, I based my classroom organization and vision on feminist pedagogy. Liz Stanley and Sue Wise (1993) believe that "the key role of the feminist researcher [is] *producing*, not just reflecting, the social reality such research is apparently designed to 'uncover.' [The] researcher is an active presence, an agent, in research" (p. 6). In short, I helped create the interactions I wished to study. I see a classroom based on feminist pedagogy as a community of learners where power is shared and where participatory, democratic processes help learners develop independence. This classroom is collaborative, cooperative, and interactive. It is an active classroom where risk-taking is encouraged, where intellectual excitement abounds, and where power is viewed as energy, capacity, and potential rather than domination.

Selfe (1990) maintains that it's time for educators to re-examine the "theoretical and pedagogical premises upon which they base their classes, their research, and their curricula" (p. 190). Now that the first wave of excitement about the new technology has subsided, Selfe asserts that educators must conduct research that will help teachers move away from the "atheoretical, untested, [and] unexamined" (p. 190) approaches currently in use, such as (a) computer labs where all students work in a lock-step, computer literacy curriculum, (b) the use of computers as a reward for students who have completed work or behaved well, or (c) the use of computers as electronic workbooks that offer children endless drill-and-practice exercises to reinforce isolated skills. Selfe suggests that teachers must be more theoretically informed as they integrate computers into the elementary school curriculum.

Gail Hawisher and Charles Moran's (1993) essay "Electronic Mail and the Writing Instructor," explored the possibility of an e-mail pedagogy. They suggested that e-mail is beginning to dissolve some of the long-standing boundaries between students and teachers. They envision this new pedagogy as a vehicle for questioning how we teach, how e-mail may change how we teach, how it may personally impact our lives or impact our roles as teachers and as scholars, or whether e-mail is even a medium worthy of study. This pedagogy will allow us to investigate differences between paper mail and e-mail and to examine the social and cultural ramifications of using e-mail as a medium for connecting with others.

Description of the Study

Searching the Internet really taught us about what is happening around the world and why it's happening.
Everyone learned ALOT, even Alice!
Laurie, Age 9, December Newsletter

In the role of teacher/researcher, I offered three intensive Telecommunications Workshops to elementary school students. Approximately 12 students attended each workshop. The average age of the children was nine years, one month. The 30 children who self-selected the workshops spent between 35 and 105 hours interfacing with technology outside the regular school setting. 59% of the participants were girls, 41% were boys. There was racial diversity within the group: 69% White, 17% Hispanic, 7% African-American, and 7% Asian. The workshops took place in a computer lab that housed 12 high-end Macintosh computers with color monitors and internal CD-ROM drives. They were able to support multi-use telecommunications via Ethernet connections; all were networked to an Apple LaserWriter printer. The site also housed a teacher work station containing a high-end Macintosh, an overhead projector, and an LCD projection panel. This setup allowed an image on my monitor to be projected onto a large screen so that participants could easily view the image and the process I used to achieve this image.

After I introduced the children to both electronic mail and several tools for browsing the Internet (Gopher, Veronica, and Mosaic—Netscape was not available at the time of this study), the children were responsible for deciding how to spend their time each day. My goal was to provide an open-ended environment that would help me understand how the children used and viewed technology and how reading and writing might be enhanced through the use of technology. Such a format did not impose a specified "curriculum" with its corollary skills and outcomes, but rather it allowed the children to make choices about how they wanted to spend their time, which topics they wished to pursue, and who they chose to write to via electronic mail.

Setting the Stage

When I first started doing my research with the Internet,
I thought it was going to be very hard.
But after a bit, it really wasn't so hard after all.

Julia, Age 8, December Newsletter

I speld my water and I got all my spelling rong.
I had a hard day and a very rauf day and a mean day today
did you have a mean day? I like you as a teacher.
love Jing-Mei

Jing-Mei, Age 8, September 26, 1994

Two weeks have passed since the first day of our Telecommunications Workshop. I think back to that first day remembering the wide-eyed wonder of the 9- and 10-year-old children as we began our adventure together. For now, the computer lab is quiet. I am here alone waiting for the rush of excitement that always occurs when the children arrive. I have completed my morning tasks: setting up the camcorders and audiocassette recorders, checking the electronic equipment, reading and answering my extensive e-mail, then settling and focusing myself for three and a half hours of intensive learning and interacting with 12 energetic and inquisitive children. I hear the pounding footsteps in the hall; five boys and seven girls dash to get to our Telecommunications Workshop. Even though there is a computer for each child, they rush to take the one they have grown fond of. Girls prefer the front of the

room, boys the back. The routines the students and I have negotiated are working smoothly. Without instruction or direction from me, the children turn on their computers, open their electronic mail programs, and anxiously begin reading and answering their mail. The room is practically silent; an occasional laugh or exclamation permeates the silence. All eyes are on computer screens; all little fingers are poised over keyboards. E-mail is important. During the three workshops, the participants generated more than 1,300 e-mail messages!

Profile One

Thnks for send mall.

Tony, Age 10, June 14, 1994

Tony is the first to finish reading and responding to his e-mail, completing what he wishes to do in about five minutes. He moves hurriedly to Veronica (an Internet searching tool). When I ask him about his e-mail correspondence, Tony replies that he's written all he intends to and that he wants to get immediately into Veronica to look for pictures of aliens. Later I discover that Tony has written his standard "I hope you have a good day" message to the class and his typical "Thanks for being my teacher" or "Thanks for sending mail" message to me. Tony does not enjoy writing to me or his classmates; he struggles with both spelling and the keyboard and would much rather spend his time searching the Internet for images of his own choosing.

Toward the end of the workshop that day, Tony rushes up to me excitedly. "Look at all my alien pictures," he exclaims, leafing through a dozen different images he has found, downloaded, and printed that day.

"I did these all by myself," he reports triumphantly. "Can I find more tomorrow?"

Tomorrow follows tomorrow and soon he has accumulated quite a collection of pictures of aliens. Some resemble bizarre humans and others are ghoulish and often sinister creatures.

"Why don't you write a short report about aliens?" I inquire. Several days later, Tony presents me with the following piece:

ALIENS
by Tony Cortez
An alien is frm outr
space . It is big, and
ugle . And it bleeds
acid and it kills.
And they live dep
in space. They like
to bee alone. The
queene staz with the
eggs. The queen has
2 parts. The queen
makes the babys
on a prsin.

The End

Tony sees no need to write to people whom he sees and talks with every day. Oral communication is less time consuming, more direct, and less frustrating than written communication. Speaking also eliminates the possibility of embarrassment caused by what Tony calls his "bad" spelling. Writing via e-mail is neither rewarding nor useful for Tony, and he does not apologize for pursuing his own agenda. He complies in a minimalist way with my request to write e-mail, then moves hurriedly to explore the Internet. After locating numerous pictures of aliens, he begins gathering textual information about aliens. By seeking his own path, he both engages in authentic reading and writing and enhances his confidence and competence in reading and writing. During our final interview, Tony reported:

> *I didn't know hardly anything about computers when I started. Now I know how to print. I know how to do Veronica. I know how to do asumail. I know how to print pictures. I know how to do Internet, Gopher, and TurboGopher. I know how to go to other states and talk to them. I KNOW LOTS! And I know how to READ and WRITE MUCH, MUCH better!*

Profile Two

> *This message is from my house*
> *on my motem.see you in class.*
>
> *Christi, Age 10, June 22, 1994*

Christi and Mandy spend considerably more time on their e-mail correspondence than does Tony. Best of friends, they choose to sit next to one another during our workshop. Mandy missed the first few days of the workshop and Christi has voluntarily assumed the role of peer tutor. They often chat quietly as they read and write messages and frequently write e-mail messages to one another. Today, they exchange five messages within a nine-minute time span:

Mandy	9:34:48	Dear c, I can't what tell you come over.
Christi	9:37:51	Dear Mandy, My Sister ate all the apples lastnight so I didn't have anything to bring!
Mandy	9:40:57	How rude !!!!!!!!!!!!!!!!!!
Christi	9:42:59	Dear Mandy, Are you talking about my sister?
Mandy	9:43:59	YES !!!!!!!!!!!!!!!!!!

Christi also writes to three of her female classmates—Katey, Julia, and Janet:

To Katie	9:12:40	Dear Katey, Will you call your mom and ask her if you can come over?
To Julia	9:37:51	Dear Janet, I am having a good day!
To Janet	9:25:09	Dear Jenni, How are you? If you see Sterling tell him I said hi O.K!

Mandy spends her time writing her Dad, who has an electronic mail account.

Dad	14:16:00	Thank you for the note. It is one of the brightest parts of my day when I see your ID on my "E-Mail". I love you too and thanks again.
Mandy	9:08:04	Dear dad, Hi! I have a question can I have a Halloween party? write me a note thank You! Mandy !!!!!! p.s. x's & o's

After 45 minutes on personal correspondence, Christi and Mandy are ready to move on. They are both avid Internet explorers and have found that it's more fun and more

productive to explore together. Mandy was born in Alaska; today they choose to travel electronically to Alaska to find out what they can about Mandy's birth state.

Christi and Mandy's interactions are a testimony to the importance of a social context for reading and writing. These preteen girls use telecommunications to extend their on-going social chitchat. Not only do they use e-mail to maintain their relationship, their use of e-mail adds another dimension to their relationship. Working together on their research about Alaska is another social activity the girls enjoy. In this scenario, the girls are meeting their own social needs and are simultaneously engaging in extensive reading and writing. When a classroom is structured to take advantage of the social nature of language and language learning, students are more likely to see their reading and writing as purposeful and important. Since children learn to read by reading and to write by writing, opportunities for enhancing reading and writing abound in the electronic world of cyberspace.

The final profile highlights how a virtual nonreader and nonwriter became an excellent researcher when left to his own devices.

Profile Three

Dear,alice
halow good biy
Love,Mike

Mike, Age 8, September 26, 1994

Dear alice
I rot miy penpal
from mike

Mike, Age 8, October 5, 1994

Mike is small for his eight years. Quiet and unassuming, he maintains a low profile so that he doesn't call attention to what his mother calls "his reading problem." He strives to be very independent and maintains an "I-can-do-it-on-my-own" attitude, which is characteristic of many of the boys in his class. Had his mother not specifically warned me of his reading problem, I would not have easily identified a problem in this area. Mike, it seems, has developed excellent coping skills that have helped him disguise his struggles with reading.

Mike seldom asks for help and is quite content relying on his own devises to accomplish his goals; he finds help by an outsider to be an interference. If I try to help, he puts his head on his desk and refuses to interact with me. Taking this as my cue, I leave him alone and interact with him *only* when he asks for guidance. He wants to explore the Internet on his own—in ways that are comfortable to him, not in ways that work for me. Mike's strategy is to go after pictures—and go after pictures he does. As a sports enthusiast, he finds pictures of Babe Ruth and other baseball celebrities, Joe Montana and his football team, every famous basketball player to grace the NBA, and on and on and on. I am amazed each time I come into his vicinity and see another colorful image on his computer monitor and a never-ending grin on his face. Mike can find things on the Internet that others don't even know exist.

After several weeks of gathering pictures, organization becomes a problem. With

icons for more than 40 different pictures on his desktop, things are getting too chaotic for Mike to deal with. When friends ask him to show them his great Kevin Johnson picture, he can't find it in his wide collection.

"Alice, is there a way to put these in piles so I can find stuff?"

"Do you mean like storing all your baseball pictures in one place and all your cars in another place?"

"Yeah. How do you do that?"

I demonstrate to Mike how to make a folder and then how to place files in that folder. One demonstration is all he needs. Thirty minutes later, he's created seven folders and has organized all his pictures and documents within folders:

1 1 1 1 1 1 1

Mike's Mike Mike Mike's Mikes Mike Mikes

Carz Basball Futball SUNS aliens hocky Baskitbal

As his daily reading of information on the Internet increases, his writing improves as well. His emphasis remains on graphics rather than text, but within a few weeks, Mike is willing to take risks and begins work on his newsletter article. His four drafts are shown below:

Draft 1

The thang I lick abot Vronika is the pithrs.

Draft 2

The thing I like about Veronica is the pictures

Draft 3

The thing I like about Veronica is the pictures. I can see football cratoon car's basketball karate pedlice cars pedatora and alot more

Final Draft

All About Veronica
by Mike Andre-Santos

The thing I like about Veronica is the pictures. I can see football, cartoon, cars, basketball, karate, baseball, police car, predator, and alot more.

The End

My enthusiasm is reflected in my e-mail messages to Mike:

October 17, 1994	Did you enjoy exploring the Internet today? I think it's fun because you always find something you didn't expect. It's full of surprises!
October 23, 1994	I'm so proud of you. You've taken to the Internet like a fish to water. You did a super job of writing down the LONG route you took to find your information. You're turning into a great researcher!
November 2, 1994	I think I will name you the "Internet King"! You really had a great time finding sports pictures on the Internet. Congratulations on your great finds. I'm proud of you.
November 14, 1994	I'm SO PROUD of you! You've found a way you like to explore the Internet and gather information—and you're really going for the gold!

Mike demands independence, and I am wise enough to give him the latitude he demands. And so, Mike, the nonreader, becomes Mike, the researcher.

Had my Telecommunication Workshop resembled a more typical elementary school classroom, I can only guess at how badly Mike would have fared. His success story became possible because mine was not a single-text, highly teacher-controlled classroom. Mike is a bright and inquisitive child who discovered that a graphics-rich environment suited his needs much better than a text-rich environment. He became one of the most facile users of the Internet because he found a searching method that worked for him and perfected it to an art form. He collected Internet images like other children collected baseball cards—and he was envied for his fine searching skills and his great collection of pictures. When Mike was given the latitude to learn in his own way and at his own pace, his learning far exceeded my most grandiose expectations.

Concluding Thoughts

I have LEARNED e-mail and I have sent e-mail
messages to President Clinton, my class and Alice.
Linda, Age 11, June Newsletter
If you put all the pictures, documents and information I gathered
in one book you would have a book 1/2 inch thick!
And it would take you 1 day and 1 night to look through all of it.
Laurie, Age 9, December Newsletter

When reflecting on the entire experience of the Telecommunications Workshop, the children commented most frequently on two topics: how much fun they had had and how much they had learned. Learning and fun had not been equated for them before. They thought of school as work and play as fun, but they had never characterized school work as fun. This novel idea was expressed most poignantly by Linda during an interview we shared. When I asked if there were any differences between school and our workshop, she replied without hesitation. "School is 'work-work' and what we do here is 'fun-work.'" Lemke (1993) suggests that "what we today marginalized as 'informal education' will become tomorrow's norm as it is already impossible to justify any particular selection of information as THE curriculum" (p. 8). Linda was the spokesperson for the other children when she called our "informal education" fun-work and simultaneously reported, "I learned so much more in our workshop than I do in school."

Technology and telecommunications can potentially enhance literacy and shift control from a central authoritarian figure or institution to the individual. This shift would encourage (a) risk-taking, (b) open-ended exploration, (c) shared responsibility for learning and decision making, and (d) extensive opportunities for authentic reading and writing.

For children to be truly engaged in their own learning, they must have the freedom to choose those materials most appropriate for themselves as learners. As an educator who espouses a feminist pedagogy, I do not presume that all children will be equally interested in my chosen topic; nor do I presume that they will all learn with equal ease and success from one textbook (carefully chosen by a district textbook committee); nor do I presume that using one source of knowledge (i.e., a single textbook) helps children become expansive thinkers who question ideas rather than accept them as the only way of viewing a given topic. Hence, I encouraged the children in my Telecommunications Workshops to choose their own topics of study and to find their own resources on the Internet.

Children took ownership in their research because they had chosen their topics of study. And they added to their knowledge base in the way that was most comfortable to them. As second through fifth graders, their literacy levels diverged considerably. The range varied from nonreaders to expert readers capable of understanding almost anything they found on the Internet. This range was reflected in how the students went about their research. Those children, like Tony and Mike, who had not yet developed literacy skills chose to gravitate toward pictures, sound bites, and movie clips; those who were more experienced readers, like Christi and Mandy, were more

comfortable with written text; but they, too, were interested in graphic images they could capture from the Internet.

Feminist pedagogy, I believe, can give teachers the theoretical framework that will enable them to move into the future, Lemke (1993) suggested in his essay "Education, Cyberspace and Change." He affirmed that students learning in cyberspace are no longer reading from textbooks but from authentic sources; they are learning not what someone else thinks they should know but what they choose to know; they are exposed not to a single controlled version of the truth but to as many versions as they wish to investigate; and finally, they are not evaluated on whether they have learned the content of a textbook, but instead they form value judgments about the worth of what they have learned. In short, the computer and telecommunications have the potential to erode the traditional classroom organization and create a new structure where teachers and students are actively learning together, where power is shared among all participants, and where the use of technology and the Internet become highways to enhanced literacy.

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